REMARKS

Claims 13-18 and 23-25 are pending in the application and are presented for reconsideration and further examination in view of the foregoing amendments and following remarks.

In the outstanding Office Action claims 17, 18, and 23-25 were rejected under 35 U.S.C. § 112, 1st paragraph as not being enabled; claims 13-16 were rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 4,990,301 to Krishnakumar et al. in view of U.S. Patent No. 5,897,822 to van Manen et al. and U.S. Patent No. 5,032,341 to Krishnakumar et al.; and claims 17-18 and 23-25 were rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,141,695 to Nakamura in view of the Krishnakumar et al. '301 patent, the van Manen et al. '822 patent and the Krishnakumar et al. '341 patent.

By this Response and Amendment claims 13 and 15 are amended to further clarify the claimed invention and, as amended, the rejections are traversed and arguments in support of the traversal are provided.

Support for the amendments to the claims is found throughout the originally filed specification and drawings. It is therefore respectfully submitted that the above amendments introduce no new matter within the meaning of 35 U.S.C. § 132.

Rejections Under 35 U.S.C. § 112, 1st Paragraph

The Examiner rejected claims 17, 18, and 23-25 as not being

enabled, stating:

> Claim 17 teaches the formation of a five layered preform by first injecting a surface forming material (A) through an outer nozzle, stopping the flow of the surface forming material (A) and then simultaneously injecting two other materials (B and C) through inner nozzles. It is unclear if the simultaneous injection of these materials (B and C) is slightly off set. It is the examiner's understanding that starting the injection of these two materials simultaneously would produce a four-layered preform (See Nakamura) but that a slightly off set injection timing of these two materials would yield a five layered preform (See Krishnakumar et al. 1, Figures 10A and 10B). It is the examiner's belief that the applicant seems to teach the simultaneous starting and injection of both materials B and C, but the current application does not describe this process in such a way that would enable one skilled in the art to form a four layered preform through simultaneous injection of B and C if the flow of both materials are simultaneously started.

RESPONSE

Applicants respectfully traverse the rejections.

As noted by the Examiner, claim 17 teaches the formation of a five layered preform by first injecting a surface forming material (A) through an outer nozzle, stopping the flow of the surface forming material (A) and then simultaneously injecting two other materials (B and C) through inner nozzles.

However, the Examiner fails to consider that following the simultaneous injection of the components (B) and (C) further component (B) is injected during a cooling phase.

The Examiner first relies on the Nakamura '695 patent which teaches that after a first molten resin is injected, a second resin is subsequently injected which thereby parts the first resin (thereby forming 3-layers A-B-A), which in turn is followed by

subsequently injecting a third resin which thereby parts the second resin (resulting in 5-layers A-B-C-B-A). Nakamura teaches that if the second and third resins are simultaneously injected, the third resin does not part the second resin thereby resulting in a 4-layer preform. The Examiner next relies on the Krishnakumar et al. '301 patent Figs. 10A and 10B for the proposition that staggered start times of the second and third resins is required in order for the third resin to part the second resin.

Applicant acknowledges that claim 17 teaches that after resin "A" is injected through an outer jet and conveyance thereof halted, the resins "B" and "C" are simultaneously started through an intermediate jet and an innermost jet, respectively. In accordance with Nakamura the resins "B" and "C" together part the resin "A" resulting at this stage of the method in a 4-layer preform (A-B-C-A, as viewed from the outer to inner layers). However, unlike Nakamura, and unlike the timing diagram disclosed in Fig. 10B of the Krishnakumar et al. '301 patent, in the presently claimed invention, conveyance of the component "B" continues after conveyance of component "C" is halted.

As shown in Fig. 5 of the present application, and as claimed in claim 17, after conveyance of component "C" is halted, further component "B" is injected during the cooling phase to replace material which has shrunk. Consequently, and as shown in Fig. 5, the after injected component "B" encircles over the end of the injected component "C" closest the sprue and thereby forms a further layer of component "B" between the inner layer of component

"A" and the inner surface of the previously injected component "C". As result a 5-layer preform is thus formed having, in sequence from outermost layer to inner most layer, layers A-B-C-B-A.

Applicants therefore respectfully submit that claim 17 as previously amended and as herein resubmitted is fully enabled by the originally filed disclosure. Claims 18 and 23-25, each dependent from claim 17, are submitted to be enabled by the originally filed application for at least the same reasons that claim 17 is enabled thereby.

Accordingly, reconsideration and withdrawal of the rejections is respectfully requested.

Rejections Under 35 U.S.C. § 103

The Examiner rejected claims 13-16 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,990,301 (Krishnakumar et al. 1) in view of U.S. Patent No. 5,897 ,822 (van Manen et al.), and U.S. Patent No. 5,032,341 (Krishnakumar et al. 2).

RESPONSE

Applicants respectfully traverse the rejections.

Applicants traverse the rejections because all three prongs for a *prima facie* case of obviousness have not been established. More particularly, all the claim limitations are not present in the cited references, the cited Krishnakumar '341 patent teaches away from the claimed invention, and therefore even if combined as suggested by the Examiner the combination would not result in the

presently claimed invention.

To establish a *prima facie* case of obviousness, the Examiner must establish: (1) that some suggestion or motivation to modify the references exists; (2) a reasonable expectation of success; and (3) that the prior art references teach or suggest all the claim limitations. Amgen, Inc. v. Chugai Pharm. Co., 18 USPQ2d 1016, 1023 (Fed. Cir. 1991); In re Fine, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988); In re Wilson, 165 USPQ 494, 496 (C.C.P.A. 1970).

A *prima facie* case of obviousness must also include a showing of the reasons why it would be obvious to modify the references to produce the present invention. See Ex parte Clapp, 277 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). The Examiner bears the initial burden to provide some convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings. Id. at 974.

The instant invention, as claimed in claims 13-16, as originally submitted and as herein resubmitted, is directed to a method for operating a multi-component injection moulding form tool to produce 3-layered formed bodies.

I. As claimed in claim 13, a multi-component injection moulding form tool having a hot runner nozzle is provided with a needle shut-off mechanism adapted to release or block one inner jet chamber and one outer jet chamber of the nozzle. The needle shut-off mechanism has a movable needle and at least one first plunger and one second plunger cooperating therewith and arranged such that

the plungers are movable within a cylindrical barrel, each plunger being longitudinally shiftable in such a manner that the needle is brought into a selected one of a plurality of releasing/blocking positions in the one inner and one outer jet chambers. A component "A" having a first viscosity can be selectively injected through the one inner jet chamber to form a thin surface layer of new material. A component "B" having a viscosity greater than the viscosity of the component "A" can be selectively injected as a filler material through the one outer jet chamber. The method has an operating cycle comprising in sequence the following steps:

Positioning the needle into a selected first one of the plurality of positions so that the one inner jet chamber and the one outer jet chamber are opened;

Conveying the surface layer forming component "A" through the one inner jet chamber there while not conveying the filler material component "B" through the one outer jet chamber;

Thereafter conveying component "B" through the one outer jet chamber in order to produce a three-layered preform with a component B content of over 35 %;

Cooling the components A and B in a cooling phase there while replacing material shrunk during the cooling phase with further component "B" such that the component "B" content amounts to over 35 vol. %; and, in order to complete the cycle,

Positioning the needle into a selected other of the plurality of positions whereby both the one inner jet chamber and the one outer jet chamber are closed.

In contrast, none of the cited references disclose a needle shut-off mechanism having a movable needle and at least one first plunger and one second plunger cooperating therewith and arranged such that the plungers are movable within a cylindrical barrel, each plunger being longitudinally shiftable in such a manner that the needle is brought into a selected one of a plurality of releasing/blocking positions in the one inner and one outer jet chambers as claimed in claim 13. Furthermore, none of the cited references disclose that the viscosity of the component "B" is greater than the viscosity of the component "A" as also claimed in claim 13. None of the cited references disclose positioning the needle into a selected first one of the plurality of positions so that the one inner jet chamber and the one outer jet chamber are opened and conveying the surface layer forming component "A" through the one inner jet chamber there while not conveying the filler material component "B" through the one outer jet chamber and thereafter conveying component "B" through the one outer jet chamber. None of the cited references disclose cooling the components A and B in a cooling phase there while **replacing material shrunk during the cooling phase with further component "B"** such that the component "B" content amounts to over 35 vol. %; and, in order to complete the cycle. Finally, none of the cited references disclose positioning the needle into a selected other of the plurality of positions whereby both the one inner jet chamber and the one outer jet chamber are closed.

To the contrary, the cited Krishnakumar et al. '341 patent at

col. 1, lines 44-61 teaches away from the claimed invention in that the Krishnakumar et al. patent specifically teaches "making the last injected material the same or substantially the same as the first injected material".

It is therefore submitted that the combination of references asserted by the Examiner not only fails to teach all of the limitations as claimed in claim 13; but, more importantly, the purported combination specifically teaches away from the instant invention in that the Krishnakumar et al. patent purports to teach that it is undesirable for the last injected material to be the core forming filler material, as claimed in claim 13.

It is therefore submitted that claim 13, as previously amended, and as herein amended and resubmitted, is patentable over the cited combination of references. Claim 14, dependent from claim 13, is asserted to be patentable over the cited combination for at least the same reasons that claim 13 is patentable thereover.

Accordingly, reconsideration and withdrawal of the rejections of claim 13-14 is respectfully requested.

II. As claimed in claim 15, a multi-component injection moulding form tool having a hot runner nozzle is provided with a needle shut-off mechanism adapted to release or block one inner jet chamber and one outer jet chamber of the nozzle. The needle shut-off mechanism has a movable needle and at least one initial plunger and one second plunger cooperating therewith, arranged such that

the plungers are movable within a cylindrical barrel, each plunger being longitudinally shiftable in such a manner that the needle is brought into a selected one of a plurality of releasing/blocking positions in the one inner and one outer jet chambers. A component "C" can be selectively injected through the one inner jet chamber to form a thin barrier layer of barrier material and a component "B" can be selectively injected as a filler material through the one outer jet chamber. The method has an operating cycle comprising in sequence the following steps:

Positioning the needle into a selected first one of the plurality of positions so that the one inner jet chamber and the one outer jet chamber are opened;

Conveying the barrier layer forming component "C" through the one inner jet chamber there while not conveying the filler material component "B" through the one outer jet chamber;

Thereafter simultaneously conveying the component "C" through the one inner jet chamber there while conveying the component "B" through the one outer jet chamber in order to produce a three-layered preform with a barrier layer of component "C" such that the component "C" content amounts to 5 % or less of the overall volume;

Interrupting conveyance of component "C" in such a manner that there while only component "B" continues to be conveyed into a mould cavity from the outer jet chamber;

Cooling the components "B" and "C" in a cooling phase there while replacing material shrunk during the cooling phase with further component "B"; and, in order to complete the cycle,

Positioning the needle into a selected other of said plurality of positions whereby both the one innermost jet chamber and the one outer jet chamber are closed.

In contrast, none of the cited references disclose a needle shut-off mechanism having a movable needle and at least one initial plunger and one second plunger cooperating therewith, arranged such that the plungers are movable within a cylindrical barrel, each plunger being longitudinally shiftable in such a manner that the needle is brought into a selected one of a plurality of releasing/blocking positions in the one inner and one outer jet chambers as claimed in claim 15. None of the cited references disclose positioning the needle into a selected first one of the plurality of positions so that the one inner jet chamber and the one outer jet chamber are opened and conveying a barrier layer forming component "C" through the one inner jet chamber there while not conveying the filler material component "B" through the one outer jet chamber and thereafter simultaneously conveying component "C" through the one inner jet chamber and component "B" through the one outer jet chamber. None of the cited references disclose interrupting conveyance of the barrier layer component "C" there while continuing to convey filler material component "B". None of the cited references disclose cooling the components "C" and "B" in a cooling phase there while **replacing material shrunk during the cooling phase with further component "B"**. Finally, none of the cited references disclose positioning the needle into a selected other of the plurality of positions whereby both the one inner jet

chamber and the one outer jet chamber are closed.

To the contrary, the cited Krishnakumar et al. '341 patent at col. 1, lines 44-61 teaches away from the claimed invention in that the Krishnakumar et al. patent specifically teaches "making the last injected material the same or substantially the same as the first injected material".

It is therefore submitted that the combination of references asserted by the Examiner not only fails to teach all of the limitations as claimed in claim 15; but, more importantly, the purported combination specifically teaches away from the instant invention in that the Krishnakumar et al. patent purports to teach that it is undesirable for the last injected material to be the core forming filler material, as claimed in claim 15.

It is therefore submitted that claim 15, as previously amended, and as herein amended and resubmitted, is patentable over the cited combination of references. Claim 16, dependent from claim 15, is asserted to be patentable over the cited combination for at least the same reasons that claim 15 is patentable thereover.

Accordingly, reconsideration and withdrawal of the rejections of claim 15-16 is respectfully requested.

III. The Examiner rejected claims 17-18 as obvious over U.S. Patent No. 5,141,695 (Nakamura) in view of the Krishnakumar et al. '301 patent, the van Manen et al. '822 patent, and the Krishnakumar et al. '341 patent.

RESPONSE

Applicant respectfully traverses the rejections.

The instant invention, as claimed in claim 17, as previously amended and as herein resubmitted without further amendment, is directed to a method for producing a 5-layered preform.

As claimed in claim 17, during a first step in a moulding cycle an inner jet chamber (corresponding to a component "C"), an outer jet chamber (corresponding to a component "A"), and an intermediate jet chamber located between the inner and outer jet chambers (corresponding to a component "B") are each in an opened condition and only the component "A" is conveyed through the outer jet chamber. In a second step in the moulding cycle conveyance of the component "A" is halted and components "B" and "C" are each simultaneously conveyed. In a third step in the moulding cycle conveyance of component "C" is halted and further component "B" is conveyed to compensate for shrinkage during cooling.

In contrast the cited primary reference - the Nakamura et al. '695 patent discloses at col. 3, lines 5-31, that in making a 5-layered preform a first resin is first injected through an outer passage. After injecting the first resin a second resin is injected through an intermediate flow passage into the first resin thereby parting the first resin with a resultant layer sequence: 1-2-1, and a third resin is thereafter injected into the second resin thereby parting the second resin with a resultant layer sequence: 1-2-3-2-1.

The Nakamura '695 patent does not fairly teach or suggest that

the second and third resins are simultaneously injected as claimed in the second step of claim 17.

In the present invention, as claimed in claim 17, after simultaneously conveying components "B" and "C" into the "A" component, conveyance of component "C" is halted; and, further component "B" is injected to compensate for material shrinkage during cooling.

None of the cited references disclose replacing material shrunk during the cooling phase with further component "B", as claimed in claim 17.

To the contrary, the cited Krishnakumar et al. '341 patent at col. 1, lines 44-61 teaches away from the claimed invention in that the Krishnakumar et al. patent specifically teaches "making the last injected material the same or substantially the same as the first injected material".

It is therefore submitted that the combination of references asserted by the Examiner not only fails to teach all of the limitations as claimed in claim 17; but, more importantly, the purported combination specifically teaches away from the instant invention in that the Krishnakumar et al. patent purports to teach that it is undesirable for the last injected material to be the core forming filler material, as claimed in claim 17.

It is therefore submitted that claim 17, as previously amended, and as herein resubmitted without further amendment, is patentable over the cited combination of references. Claim 18, dependent from claim 17, is asserted to be patentable for at least

the reasons that claim 17 is patentable thereover.

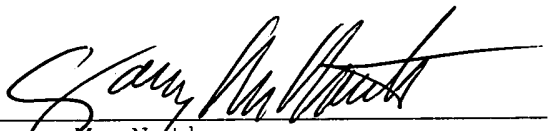
Accordingly, reconsideration and withdrawal of the rejections is respectfully requested.

CONCLUSION

In light of the foregoing, Applicant submits that the application is in condition for allowance. If the Examiner believes the application is not in condition for allowance, Applicant respectfully requests that the Examiner contact the undersigned attorney if it is believed that such contact will expedite the prosecution of the application.

Respectfully submitted,

NATH & ASSOCIATES PLLC



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Attachment "A"
(Marked-Up Copy of Amended Claims)

13. (Twice Amended) Method for operating a multi-component injection moulding form tool to produce multi-layered formed bodies, comprising:

providing a [the] multi-component injection moulding form tool having: a hot runner nozzle with a needle shut-off mechanism adapted to release or block one inner jet chamber and one outer jet chamber of the nozzle, the needle shut-off mechanism having a movable needle and at least one first plunger and one second plunger cooperating therewith, arranged such that said plungers are movable within a cylindrical barrel, each plunger being longitudinally shiftable in such a manner that the needle is brought into a selected one of a plurality of releasing/blocking positions in said one inner and one outer jet chambers whereby a component A having a first viscosity can be selectively injected through the one inner jet chamber to form a thin surface layer of new material and a component B having a viscosity greater than the viscosity of the component A can be selectively injected as a filler material through the one outer jet chamber, said method having an operating cycle comprising in sequence the following steps:

[in a first step in the cycle,] positioning the needle into a selected first one of said plurality of positions so that the one inner jet chamber and the one outer jet chamber are opened

[and];

conveying the surface layer forming component A through the one inner jet chamber [and] there while not conveying the filler material component B through the one outer jet chamber;

[characterised in that, in order to produce a three-layered preform with a component B content of over 35 %,] thereafter conveying component B [is conveyed] through the one outer jet chamber [in a second step in the cycle] in order to produce a three-layered preform with a component B content of over 35 %; [and]

cooling the components A and B in a cooling phase there while replacing [in a third step in the cycle] material shrunk during [a] the cooling phase [is replaced] with further component B such that the component B content amounts to over 35 vol. %; and, in order to complete the cycle,

positioning the needle into a selected other of said plurality of positions whereby both the one inner jet chamber and the one outer jet chamber are closed.

15. (Amended) Method for operating a multi-component injection moulding form tool to produce multi-layered formed bodies, comprising:

providing a [the] multi-component injection moulding form tool having: a hot runner nozzle with a needle shut-off mechanism adapted to release or block one inner jet chamber and one outer jet chamber of the nozzle, the needle shut-off mechanism having a

movable needle and at least one initial plunger and one second plunger cooperating therewith, arranged such that said plungers are movable within a cylindrical barrel, each plunger being longitudinally shiftable in such a manner that the needle is brought into a selected one of a plurality of releasing/blocking positions in said one inner and one outer jet chambers whereby a component C can be selectively injected through the one inner jet chamber to form a thin barrier layer of barrier material and a component B can be selectively injected as a filler material through the one outer jet chamber, said method having an operating cycle comprising in sequence the following steps:

[in a first step in the cycle,] positioning the needle into a selected first one of said plurality of positions so that the one inner jet chamber and the one outer jet chamber are opened [and];

thereafter conveying the barrier layer forming component C through the one inner jet chamber [and] there while not conveying the filler material component B through the one outer jet chamber;

[characterised in that, in order to produce a three-layered preform with a barrier layer of component C, component C and component B are, respectively,] thereafter simultaneously [conveyed] conveying the component C through the one inner jet chamber [and] there while conveying the component B through the one outer jet chamber [in a second step in the cycle] in order to produce a three-layered preform with a barrier layer of component

C such that the component C content amounts to 5 % or less of the overall volume;

[in a third step in the cycle,] interrupting conveyance of component C [is interrupted] in such a manner that there while only component B [is] continues to be conveyed into a mould cavity from the outer jet chamber; [and]

cooling the components B and C in a cooling phase there while replacing [in a fourth step in the cycle,] material shrunk during [a] the cooling phase [is replaced] with further component B; and, in order to complete the cycle,

positioning the needle into a selected other of said plurality of positions whereby both the one innermost jet chamber and the one outer jet chamber are closed.

13. (Twice Amended) Method for operating a multi-component injection moulding form tool to produce multi-layered formed bodies, comprising:

providing a multi-component injection moulding form tool having: a hot runner nozzle with a needle shut-off mechanism adapted to release or block one inner jet chamber and one outer jet chamber of the nozzle, the needle shut-off mechanism having a movable needle and at least one first plunger and one second plunger cooperating therewith, arranged such that said plungers are movable within a cylindrical barrel, each plunger being longitudinally shiftable in such a manner that the needle is brought into a selected one of a plurality of releasing/blocking positions in said one inner and one outer jet chambers whereby a component A having a first viscosity can be selectively injected through the one inner jet chamber to form a thin surface layer of new material and a component B having a viscosity greater than the viscosity of the component A can be selectively injected as a filler material through the one outer jet chamber, said method having an operating cycle comprising in sequence the following steps:

positioning the needle into a selected first one of said plurality of positions so that the one inner jet chamber and the one outer jet chamber are opened;

conveying the surface layer forming component A through the one inner jet chamber there while not conveying the filler material component B through the one outer jet chamber;

thereafter conveying component B through the one outer jet chamber in order to produce a three-layered preform with a component B content of over 35 %;

cooling the components A and B in a cooling phase there while replacing material shrunk during the cooling phase with further component B such that the component B content amounts to over 35 vol. %; and, in order to complete the cycle,

positioning the needle into a selected other of said plurality of positions whereby both the one inner jet chamber and the one outer jet chamber are closed.

15. (Amended) Method for operating a multi-component injection moulding form tool to produce multi-layered formed bodies, comprising:

providing a multi-component injection moulding form tool having: a hot runner nozzle with a needle shut-off mechanism adapted to release or block one inner jet chamber and one outer jet chamber of the nozzle, the needle shut-off mechanism having a movable needle and at least one initial plunger and one second plunger cooperating therewith, arranged such that said plungers are movable within a cylindrical barrel, each plunger being longitudinally shiftable in such a manner that the needle is brought into a selected one of a plurality of releasing/blocking

positions in said one inner and one outer jet chambers whereby a component C can be selectively injected through the one inner jet chamber to form a thin barrier layer of barrier material and a component B can be selectively injected as a filler material through the one outer jet chamber, said method having an operating cycle comprising in sequence the following steps:

positioning the needle into a selected first one of said plurality of positions so that the one inner jet chamber and the one outer jet chamber are opened;

thereafter conveying the barrier layer forming component C through the one inner jet chamber there while not conveying the filler material component B through the one outer jet chamber;

thereafter simultaneously conveying the component C through the one inner jet chamber there while conveying the component B through the one outer jet chamber in order to produce a three-layered preform with a barrier layer of component C such that the component C content amounts to 5 % or less of the overall volume;

interrupting conveyance of component C in such a manner that there while only component B continues to be conveyed into a mould cavity from the outer jet chamber;

cooling the components B and C in a cooling phase there while replacing material shrunk during the cooling phase with further component B; and, in order to complete the cycle,

positioning the needle into a selected other of said plurality of positions whereby both the one innermost jet chamber and the one outer jet chamber are closed.